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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 301761/REO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2003/001130	International Filing Date (day/month/year) 2 September 2003	Priority Date (day/month/year) 2 September 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ G11C 27/02, H04R 25/00, A61N 1/36		
Applicant COCHLEAR LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 2 February 2004	Date of completion of the report 21 December 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer RICHARD REED Telephone No. (02) 6283 7927

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the drawings, pages , as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand.
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees:
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

As understood by the Examiner the claims relate to six inventions that lack a potentially novel special technical feature. These claim families are listed below in brief terms that are understood to encapsulate the key feature or purpose. These comments should be read in conjunction with other parts of this Examination Report.

- a) Claims 1, 3 to 9 and 11 to 16 relate to detecting an envelope of a filtered signal using a peak detector.
- b) Claims 2 to 8 and 10 to 16 relate to detecting the envelope of a signal that is filtered into frequency bands and each band is peak detected.
- c) Claims 17 to 24 and 37 to 49 relate to enhanced pitch cue with a half-wave rectifier.
- d) Claims 25 to 36 relate to enhanced pitch cue using a peak detector with threshold feature.
- e) Claims 50 to 53, 59 to 63 and 71 to 74 relate to enhanced pitch cue using a peak detector such that the peak samples are synchronised to the audio signal.
- f) Claims 54 to 58 and 64 to 70 relate to enhanced pitch cue using an envelope detector such that the envelope is sampled and the samples are synchronised to the filtered audio signal.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 2, 6 to 8, 10, 14 to 16 and 25 to 74	YES
	Claims 1, 3 to 5, 9, 11 to 13 and 17 to 24	NO
Inventive step (IS)	Claims 26 to 29, 31 to 36, 38 to 40, 42 to 49, 51 to 54, and 60 to 74	YES
	Claims 1 to 25, 30, 37, 41, 50 and 55 to 59	NO
Industrial applicability (IA)	Claims 1 to 74	YES
	Claims None	NO

2. Citations and explanations (Rule 70.7)

The associated International Search Report cited the following documents:

- D1 = Graf, R. F. "Encyclopedia of Electronic Circuits", 1991, Vol. 3, page 152, Tab Books, ISBN 0-8306-3348-0
- D2 = US 5180931 A (HARADA) 19 January 1993. Whole document.
- D3 = US 4620444 A (YOUNG) 4 November 1986. Whole document.
- D4 = US 4028627 A (CHO et al) 7 June 1977 which incorporates US4034299 A (CHO et al) 5 July 1977 and US 4013962 A (BESEKE et al) 22 March 1977. Whole document.

Novelty

Claims 1, 3 to 5, 9, 11 to 13 and 17 to 24 lack novelty in light of D2. Document D2 teaches a peak and valley sample and hold peak detector using a half-wave rectifier.

Claims 1, 3 to 5, 9, 11 to 13 and 17 to 24 lack novelty in light of D4. Taught is a two channel envelope detector which can operate on multiple bands, a valley detector, and sampling.

Inventive Step

All claims are strictly novel in light of D1 as there is no specific teaching of the audio signal being filtered or being filtered into multiple bands.

However, D1 does teach a wide range peak detector with rest immediately after sampling. Filtering audio signals, such as low pass filtering to remove noise is common place and so the claim 1 lacks an inventive step. Likewise claim 2 lacks an inventive step since filtering into bands is well known to the art. Features of claims 3 to 25, 30, 37, 41, 50 and 55 to 59 add nothing that involves an inventive step being features common to the art.

Documents D2 and D3 do not teach multi-band filtering. Claims 1 to 24 lack inventive steps since the features are either taught or are well known to the art.

Claims 1 to 25, 30, 37, 41, 50 and 55 to 59 are considered not to involve an inventive step in light of D4.

Industrial Applicability

The claimed invention has industrial applicability in signal processing. The processing is not restricted to any particular application and is applicable where a sampled representation is desired.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The claims include a number of interpretation issues. The following are just a selection.

It may have been the intention for the claims to be restricted to a cochlea implant processor, a method therefor or a cochlea implant arrangement including processor and prosthesis. However, many of the claims are not restricted in this manner due to the wording of the claims. Accordingly, for example, "methods for ..." type claims are not interpreted as being restricted to an application such as "enhancing pitch cue". Such claims are interpreted as being restricted to the actual defining clauses and therefore may be interpreted more broadly than possibly the applicant intended.

Use of the term "predetermined" within the claims is confusing. I cannot find any clarify statement within the description as to what is predetermined. Perhaps it was intended that "predetermined" have no effect so that in claim 1 the sampling is at time intervals and not some time interval stated in the description.

Claim 5 is unclear how the peaks are to remain constant prior to sampling. For example, is the detection rate so quick that any variation in signal is effectively constant? Or perhaps a sample and hold is being used prior to the stated sampling? Or is sampling only occurring when the signal is relatively constant as at a peak?

Claim 7 and 15 is unclear due to the indefinite term "relatively low". Claims 19 and 21 have a similarly indefinite term "relatively high".

Claim 8 is unclear since the claim relates to a method and the defining feature is apparently an apparatus. Perhaps an apparatus performing the method was intended?

Claim 17 and 20 are unclear since whilst it is to a method of enhancing the pitch cue there is nothing to pitch cue determination or the like.

Claims 25 and 30 requires a comparison of the filtered audio signal. It is unclear to what the signal is being compared.

Claim 28 is unclear. It depends from claim 26 which uses in-phase and quadrature-phase filtered components of the audio signal. Claim 28 adds to claim 26 in-phase and quadrature-phase filters which are inherently encompassed by claim 26. It is unclear what claim 28 adds over claim 26. Similar comments apply to claim 45.

Claim 50 is unclear due to the term "samples are synchronised to the filtered audio signal". What is this intended to mean? Inherently a sampled signal is synchronised to its parent.

Finally, many of the claims are of very broad scope far exceeding the field of cochlea implants and processor therefor. Whilst this Office does not make a determination in this regard it should be appreciated that the scope of the claims may exceed that which other patent offices consider acceptable.